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Reply to Office Action of 04/19/2006

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (currently amended) A method for performing a hot start polymerase chain reaction (PCR), comprising:
  - loading a reaction mixture in a reaction channel of a microfluidic device, said reaction mixture comprising a primers, a template molecules, and a buffers but no polymerase enzyme;
  - applying an electrical current to heat the reaction channel; and
  - delivering a polymerase enzyme into the reaction channel; and
  - subjecting the reaction channel to conditions such that a hot start polymerase chain reaction is performed.
2. (canceled)
3. (currently amended) The method of claim 1, wherein the reaction mixture comprises a series of reaction mixture slugs, whereby each reaction mixture slug comprises a primers, a template molecule, and a buffers but no polymerase enzyme.
4. (currently amended) The method of claim ~~13~~, wherein the polymerase enzyme is delivered subsequent to the delivery of a first reaction mixture slug into the reaction channel.
5. (original) The method of claim 1, wherein the reaction comprises denaturation of the template molecule, wherein the template molecule is denatured to provide a plurality of single stranded template molecules.
6. (currently amended) The method of claim ~~15~~, wherein the denaturation comprises incubation of said template molecule with a base.

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7. (currently amended) The method of claim 1, said reaction comprising hybridization of the primer molecules to the template molecules.
8. (currently amended) A method for performing a temperature mediated reaction, comprising:
  - loading a first component of the temperature mediated reaction in a reaction channel of a microfluidic device;
  - applying an electrical current to heat the reaction channel; ~~and~~
  - delivering a second component of the temperature mediated reaction into the reaction channel; and
  - subjecting the reaction channel to conditions such that a temperature mediated reaction is performed.
9. (currently amended) A method of claim 8, wherein the first component comprises a reaction mixture, ~~and~~ said reaction mixture comprising starting materials for the temperature mediated reaction.
10. (original) The method of claim 8, wherein the first component comprises amplification reagents for PCR comprising a template nucleic acid, a primer sequence and nucleotides.
11. (original) The method of claim 8, wherein the second component comprises a thermally stable polymerase enzyme.
12. (original) The method of claim 8, wherein the second component comprises DNA polymerase enzyme.
13. (original) The method of claim 8, wherein the electrical current is an alternating current.

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14. (currently amended) The method of claim 8 ~~further, wherein said conditions comprising~~  
include repeatedly cycling of a temperature within the reaction channel for carrying out  
denaturation, annealing and extension reactions within the temperature mediated reaction,  
wherein cycling the temperature comprises variably applying the electrical current.